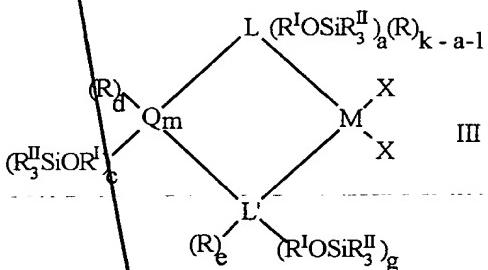
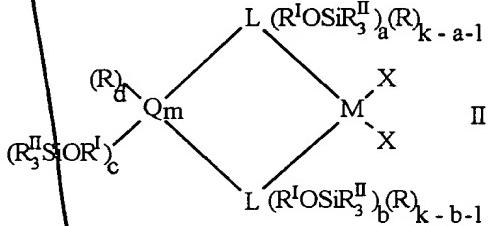


CLAIMS

5 1. Heterogeneous catalytic system obtainable by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, characterized in that the metallocene compound is defined by the following general formulas:



wherein:

L, equal to or different from each other, is selected from the group comprising:

- 15 cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl or benzoindenyl; each R is independently selected from hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkyl, C<sub>7</sub>-C<sub>20</sub> alkylaryl, C<sub>8</sub>-C<sub>20</sub> arylalkenyl, linear or branched, optionally substituted by 1 to 10 halogen atoms, or a group SiR<sup>II</sup><sub>3</sub>; each R<sup>I</sup>, equal to or different from each other, is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the periodic table of the elements and boron; preferably it is: C<sub>1</sub>-C<sub>20</sub> alkylene, C<sub>3</sub>-C<sub>20</sub> cycloalkylene, C<sub>6</sub>-C<sub>20</sub> arylene, C<sub>7</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkylene, or alkylarylene, linear or branched, or a group SiR<sup>II</sup><sub>2</sub>; each R<sup>II</sup> is independently selected from C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkyl, C<sub>8</sub>-C<sub>20</sub> arylalkenyl or C<sub>7</sub>-C<sub>20</sub> alkylaryl, linear or branched; preferably R<sup>II</sup> is methyl, ethyl or isopropyl; each Q is independently selected from B, C, Si, Ge, Sn;

M is a metal of group 3, 4 or 10 of the Periodic Table, Lanthanide or Actinide; each X is independently selected from: hydrogen, chlorine, bromine, OR<sup>II</sup>, NR<sup>II</sup><sub>2</sub>, C<sub>1</sub>-C<sub>20</sub> alkyl or C<sub>6</sub>-C<sub>20</sub> aryl;

L' is N or O;

5 when L is cyclopentadienyl k is equal to 5, when L is indenyl k is equal to 7, when L is fluorenlyl or benzoindenyl k is equal to 9, when L is tetrahydroindenyl k is equal to 11 and when L is octahydrofluorenlyl, k is equal to 17;

z is equal to 0, 1 or 2;

x is equal to 1, 2 or 3;

10 y is equal to 1, 2 or 3;

x + y + z is equal to the valence of M;

m is an integer which can assume the values 1, 2, 3 or 4;

a and b are integers whose value ranges from 0 to k-1;

f is an integer whose value ranges from 1 to k;

15 g is an integer whose value ranges from 0 to 1;

c and e are equal to 0 or 1

a + b + c is at least 1;

a + g + c is at least 1;

d is equal to 0, 1 or 2;

20 when Q is B then c + d = 1;

when Q is C, Si, Ge or Sn, then c + d = 2;

when L' is N, then g + e = 1;

when L' is O, then g = 0 and e = 0.

2. Heterogeneous catalytic system according to claim 1 wherein the group R'OSiR<sup>III</sup><sub>3</sub> is

25 selected from CH<sub>2</sub>-CH<sub>2</sub>-OSiMe<sub>3</sub>, CH<sub>2</sub>-CH<sub>2</sub>-CH<sub>2</sub>-OSiMe<sub>3</sub>, CH<sub>2</sub>-O-CH<sub>2</sub>-OSiMe<sub>3</sub>, O-CH<sub>2</sub>-CH<sub>2</sub>-OSiMe<sub>3</sub>, SiMe<sub>2</sub>-CH<sub>2</sub>-CH<sub>2</sub>-OSiMe<sub>3</sub>, SiMe<sub>2</sub>-OSiMe<sub>3</sub> or SiMe<sub>2</sub>-CH<sub>2</sub>-CH<sub>2</sub>-CH<sub>2</sub>-OSiMe<sub>3</sub>.

3. Heterogeneous catalytic system according to claims 1-3 wherein M is titanium, zirconium or hafnium.

4. Heterogeneous catalytic system according to claims 1-4 wherein the alumoxane is

30 represented by the formulas:

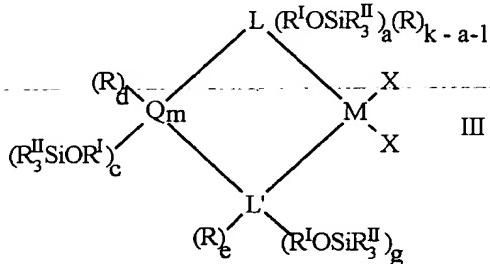
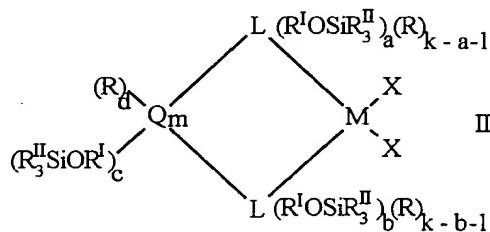


wherein R is alkyl or aryl group containing from 1 to 20 carbon atoms; n ranges from 1 to 35 40, and m ranges from 3 to 40.

- R 14  
5 6. Heterogeneous catalyst system according to claims 1-5 wherein the inorganic support is selected from silica, alumina, silica alumina, aluminium phosphates and mixtures thereof.
- 6 7. Heterogeneous catalyst system according to claims 1-6 wherein the content in transition metal is comprised between 0.01 and 3% by weight.
- 5 8. Heterogeneous catalyst system according to claim 6 wherein the content in transition metal is comprised between 0.1 and 1% by weight.
- 8 9. Process for the polymerization of alpha olefins in slurry or in gas phase characterized by the use of the heterogeneous catalyst system of claims 1-8.

Q 10. Metallocene compounds according to the following formulas:

10



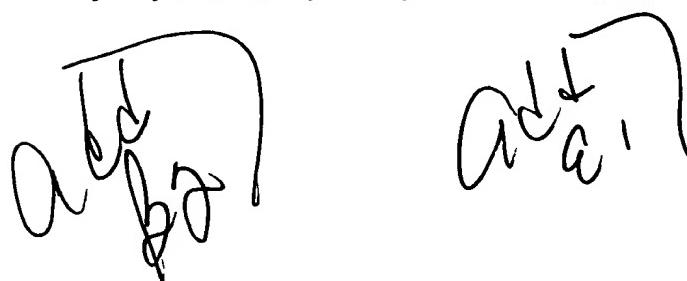
15

wherein:

L, equal to or different from each other, is selected from the group comprising: cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl and benzoindenyl;

- 20 each R is independently selected from hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkyl, C<sub>7</sub>-C<sub>20</sub> alkylaryl, C<sub>8</sub>-C<sub>20</sub> arylalkenyl, linear or branched, optionally substituted by 1 to 10 halogen atoms, or a group SiR<sub>3</sub><sup>II</sup>;
- each R<sup>I</sup>, equal to or different from each other, is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the periodic table of the elements and boron; preferably it is: C<sub>1</sub>-C<sub>20</sub> alkylene, C<sub>3</sub>-C<sub>20</sub> cycloalkylene, C<sub>6</sub>-C<sub>20</sub> arylene, C<sub>7</sub>-C<sub>20</sub> alkenyl, C<sub>7</sub>-C<sub>20</sub> arylalkylene, or alkylarylene, linear or branched, or a group SiR<sub>2</sub><sup>II</sup>;
- 25

- each  $R''$  is independently selected from  $C_1-C_{20}$  alkyl,  $C_3-C_{20}$  cycloalkyl,  $C_6-C_{20}$  aryl,  $C_3-C_{20}$  alkenyl,  $C_7-C_{20}$  arylalkyl,  $C_8-C_{20}$  arylalkenyl or  $C_7-C_{20}$  alkylaryl, linear or branched; preferably  $R''$  is methyl, ethyl or isopropyl;
- each  $Q$  is independently selected from B, C, Si, Ge, Sn;
- 5 M is a metal of group 3, 4 or 10 of the Periodic Table, Lanthanide or Actinide; preferably it is titanium, zirconium or hafnium;
- each X is independently selected from: hydrogen, chlorine, bromine,  $OR''$ ,  $NR''_2$ ,  $C_1-C_{20}$  alkyl or  $C_6-C_{20}$  aryl;
- L' is N or O
- 10 when L is cyclopentadienyl k is equal to 5, when L is indenyl k is equal to 7, when L is fluorenyl or benzoindenyl k is equal to 9, when L is tetrahydroindenyl k is equal to 11 and when L is octahydrofluorenly, k is equal to 17;
- z is equal to 0, 1 or 2;
- x is equal to 1, 2 or 3;
- 15 y is equal to 1, 2 or 3;
- $x + y + z$  is equal to the valence of M;
- m is an integer which can assume the values 1, 2, 3 or 4;
- a and b are integers whose value ranges from 0 to k-1;
- f is an integer whose value ranges from 1 to k;
- 20 g is an integer whose value ranges from 0 to 1;
- c and e are equal to 0 or 1;
- a + b + c is at least 1;
- a + g + c is at least 1;
- d is equal to 0, 1 or 2;
- 25 when Q is B then  $c + d = 1$ ;
- when Q is C, Si, Ge or Sn, then  $c + d = 2$ ;
- when L' is N, then  $g + e = 1$ ;
- when L' is O, then  $g = 0$  and  $e = 0$ .
- characterized in that at least one L is a fluorenly, benzoindenyl or octahydrofluorenly ring,
- 30 optionally substituted by  $C_1-C_{20}$  alkyl,  $C_3-C_{20}$  cycloalkyl,  $C_6-C_{20}$  aryl,  $C_3-C_{20}$  alkenyl,  $C_7-C_{20}$  arylalkyl,  $C_8-C_{20}$  arylalkenyl or  $C_7-C_{20}$  alkylaryl.



A handwritten signature consisting of two stylized, overlapping loops. The left loop contains the letters 'A' and 'B'. The right loop contains the letters 'A' and 'C' with a small downward arrow pointing towards the 'A'.